Related to the concept of physical functioning
Body functions
Respiratory muscle functions (b445)
Exercise tolerance functions (b455)
Defecation functions: sphincter control (b5253)
Urination functions: sphincter control (b6202)
Functions of joints and bones (b710-b729)
Muscle functions (b730-b749)
Movement functions (b750-b789)
Body structures
Muscles of respiration (s4303)
Structures related to movement (s7)
Activities and Participation
General tasks and demands: simple tasks (d210)
Mobility (d4)
Self-care (d5)
Domestic life (d6)
Recreation and Leisure (d920)
Environmental Factors
Products or substances for personal consumption (e110)
Products and technology for personal use in daily living (e115)
Products and technology for personal indoor and outdoor mobility and transportation (e120)
Support and relationships (e3)

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	See abstract
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	4
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	4
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	4
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	5
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	4
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	See appendix 3
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	5,6
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	6
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	6

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	N.A
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	6
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	6, 7 and figure 1
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Tables 1 and 2
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	N.A
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	8,9,10
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	8,9,10,11
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	11
Limitations	20	Discuss the limitations of the scoping review process.	13
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	12
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	1

Search	Query MEDLINE (Pubmed),Search conducted on 10-10-2019	Records retrieved
#1	"Infant"[Mesh:NoExp] OR "Child"[Mesh] OR "Adolescent"[Mesh] OR "Pediatrics"[Mesh:NoExp] OR "Minors"[Mesh] OR minors[tiab] OR boy[tiab] OR boys[tiab] OR boyfriend[tiab] OR boyhood[tiab] OR girl*[tiab] OR kid[tiab] OR kids[tiab] OR infant*[tiab] OR toddler*[tiab] OR preschool child*[tiab] OR child*[tiab] OR children*[tiab] OR schoolchild*[tiab] OR school child*[tiab] OR adolescen*[tiab] OR prepuber*[tiab] OR youth*[tiab] OR teen*[tiab] OR under age*[tiab] OR underage*[tiab] OR pubescen*[tiab] OR puber*[tiab] OR pediatric*[tiab] OR paediatric*[tiab] OR paediatric*[tiab] OR school age*[tiab] OR schoolage*[tiab]	3813791
#2	"Physical Endurance"[Mesh] OR "Motor Activity"[Mesh] OR "Activities of Daily Living"[Mesh] OR "Disability Evaluation"[Mesh:NoExp] OR "Quality of Life"[Mesh] OR "Recovery of Function"[Mesh] OR physical activit*[tiab] OR physical function*[tiab] OR physical health[tiab] OR physical impairment*[tiab] OR physical limitation*[tiab] OR physical activity limitation*[tiab] OR physical restriction*[tiab] OR physical decline[tiab] OR physical improvement*[tiab] OR physical well-being[tiab] OR physical wellbeing[tiab] OR physical endurance[tiab] OR physical performance*[tiab] OR physical disabilit*[tiab] OR physical morbidit*[tiab] OR physical mobility[tiab] OR physical evaluation[tiab] OR locomotor activit*[tiab] OR motor activit*[tiab] OR motor function*[tiab] OR motor performance*[tiab] OR activities of daily life[tiab] OR activities of daily living[tiab] OR activities of daily life[tiab] OR ADL[tiab] OR ADLs[tiab] OR daily life activit*[tiab] OR daily living activit*[tiab] OR limitation of activit*[tiab] OR participation restriction*[tiab] OR participation limitation*[tiab] OR functional health[tiab] OR functional recover*[tiab] OR recovery of function[tiab] OR functional status[tiab] OR functional performance*[tiab] OR functional morbidit*[tiab] OR functional disabilit*[tiab] OR functional decline[tiab] OR functional outcome*[tiab] OR functional deterioration*[tiab] OR functional evaluation*[tiab] OR disability evaluation*[tiab] OR health related quality of life[tiab] OR HRQOL[tiab] OR QOL[tiab] OR quality of life[tiab] OR quality of living[tiab]	929995
#3	"Critical Care"[Mesh] OR "Intensive Care Units, Pediatric"[Mesh] OR intensive care[tiab] OR PICU*[tiab] OR ICU*[tiab] OR intensive care unit*[tiab] OR pediatric intensive care unit*[tiab]	192615
#4	#1 AND #2 AND #3	1612
#5	("Animals"[Mesh] OR "Invertebrates"[Mesh] OR "Plants"[Mesh] OR "Fungi"[Mesh] OR "Animal Experimentation"[Mesh] OR "Models, Animal"[Mesh] OR animal experiment*[tiab] OR animal model*[tiab]) NOT "Humans"[Mesh]	5272074

#6	#4 NOT #5	1605
#7	"Letter" [Publication Type] OR "Editorial" [Publication Type] OR "Comment" [Publication Type] OR "Congresses as Topic"[Mesh] OR "Clinical Conference" [Publication Type] OR "Congress" [Publication Type] OR letter[ti] OR editorial[ti] OR comment[ti]	1933285
#8	#6 NOT #7	1581
#9	AND english[Language]	1434

PCC format	Inclusion criteria
Population	Studies including PICU survivors up to the age of 18 years at PICU admission.
Concept	Empirical studies reporting outcomes of and determinants for physical functioning in PICU survivors evaluated during and/or after their PICU stay.
Context	Pediatric Intensive Care Unit (PICU).
Types of Study design	All English language studies reporting empirical data will be included with no restrictions set on the types of study designs used. In addition, reviews will be included as a secondary source for synthesizing key gaps in knowledge and research and clinical recommendations related to our objectives. Conference abstracts and study protocols will not be included but will be used to search for additional, relevant articles.
Study Details and Characteristics	
ID and Title study:	
Journal:	
Study citation details	
• Author/s	
• Year of publication	
• Country	
• Context (e.g. PICU, PCardiacIC)	
• Study design	
• Objective/s	
Participants details	

• *N* (x controls, if applicable)	
• Age (*central tendency, dispersion*)	
• Gender (*m/f*) N(%)	
• Diagnostic category at admission (= sample population): • heterogeneous or ○ 2) homogeneous sample (specify category in case of homogeneous sample; e.g. Respiratory failure, Sepsis, Postsurgical care, Trauma, Cardiac, Neurologic, Endocrine, Nephrologic, Burns, Hypovolemic/hemorrhagic shock, Malignancy, Other, ….)	
• Pre-existing comorbidity, n (%) (NS for not specified)	
• chronic condition (pre-admission) (N,%)	
• Hospital length of stay (*days; average, dispersion*) (NS for not specified)	
• PICU length of stay (*days; average, dispersion*) (NS for not specified)	
• Mech. Ventilation (*days; central tendency, dispersion OR N,%)*	
Details/Results extracted from study (in relation to the concept of the scoping review)	
Follow up: *N timepoints (e.g.T1, T2, …)* *N participants per timepoint* *Follow-up moment(s) specified: e.g. days/years after PICU admission/ discharge, follow-up interval (central tendency, dispersion)*	
Physical functioning outcome: NOTE: if more tools are used: specify per tool	
• Outcome measure used	
• Measure/unit of outcome per tool (e.g. ROM, muscle strength, PF, activity limitations, ..)	

• Overall conclusion of outcomes and interpretation	
• Determinants (risk/progn factors) of outcome ((NS for not specified)	
Key gaps in knowledge and research/clinical recommendations made by the cited authors	*Copy-paste citations*

Author, year, country	**Study design**	**Sample size**	**Age PICU admission** Mean (SD) Median (IQR)	**Males (%)**	**Hospital LOS** Mean (SD) Median (IQR)	**PICU LOS** Mean (SD) Median (IQR)
Heterogeneous samples						
BL Banwell (27), 2003, Canada	Cohort	830	3 mo. -17.9 y	NR	NR	NR
S Chakdour (35), 2018, India	Cohort	29	mean 8.4 y (2.4)	83	NR	mean 9.9d (6.9)
K Choong (37), 2015, Canada	Cohort	33	mean 7.5 y (5)	55	median 19d (10-47)	median 10d (7–16)
K Choong (38), 2018, Canada	Cohort	182	median 7.2 y (2.9–13.4)	52	median 17.5d (10-29)	median 7d (4–12)
GA Colville (39), 2013, UK	Cohort	97	median 11 y (7–17)	57	NR	median 2d (0–38)
NP Conlon (40), 2009, Ireland	Cohort	193	median 39 d (2–234)	55	NR	median 43d (34–73)
F Cunha (42)(2012, Portugal	Cohort	320	range 6-18 y	53	NR	<1d: 21%; 1-4d: 46%; 4-7d: 15%; 7-14d: 10%; >14d: 8%
RJ Gemke (46), 1996, The Netherlands	Cross-sectional	468	median 55 mo.	NR	NR	median 2d
RJ Gemke (47), 1995, The Netherlands	Cohort	468	median 55 mo.	NR	NR	median 2d
CL Glau (48), 2018, USA	Cohort	56	median 16.5 mo. (5.5–52)	57	NR	NR
H K Chandler (36), 2015, USA	Cohort	16	median 2.5y (1–9.6)	56	median 26.5d (18-36.5)	median 22.5d (14-32)
JA Heneghan (52), 2019, USA	Cohort	1989	< 1y: 23% 1–5y: 39% 5–12y:24% 12–18y:14.0%	57	NR	median 3d (1.5–7)
M Jayshree (53), 2003, India	Cohort	150	mean 5.7y (3.6)	71	NR	mean 5.7d (5.5)
RW Johnson (54), 2018, USA	Cohort	33	mean 5.4y (3.4–7.4)	55	median 22.1d (5.2–119.5)	median 10d (3.3–33.7)
S Jones (55), 2006, UK	Cohort	1455	NR	54	NR	median 35 h (20.5–83.5)
G Keim (57), 2018, USA	Cohort	HD:198 RD:67	HD: median 3.3y (1.3–8.8) RD: median 7.9y (2.3–13.5)	NR	HD: median 22d (14–38) RD: median 31d (18–49)	HD: median 14d (9–24) RD: median 18d (12–34)
E Kyösti (58), 2018, Finland	Cohort	1109	mean 4.6y (5.4)	55	NR	0–24 h: 40.0%; 24–72 h: 37%; over 72 h: 22%
GA Pereira (65), 2018, Brasil	Cross-sectional	50	median 19 mo. (6–61)	60	NR	median 5d (3–12.2)
MM Pollack (66), 2014, USA	Cohort	4798	median 3.7y (0.8–10.9)	NR	NR	median 2d (1–4.8)
F Torres–Andres (72), 2018, USA	Cohort	38	NR	61	NR	NR
FV Valla (73), 2017, France and UK	Cohort	17	median 47 mo. (5–126)	88	NR	median 10d (7-13.5)
NJ Vet (75), 2016, The Netherlands	Experimental	32	median 3.1 mo. (1.3-22.7)	56	median 19.3d (12.1-37.2)	median 7.5d (5.4–17.3)

SL Ward (77), 2017, USA	Cohort	24	NR	54	median 11d (8-28)	median 9d (5–17)
RS Watson (78), 2018, USA	Experimental	497	median 3.4y (0.8–8.9)	55	median 17d (10–30)	median 10.1d (6.3–18.1)
RS Watson (79), 2019, USA	Cohort	949	2wk. - <2y: 53% 2y - <6y: 18% 6y - <18y: 30%	54	NR	NR
L van Zellem (74), 2015, The Netherlands	Cohort	57	median 57mo. (4.9–193.3)	51	NR	NR
Cardiac disease						
AG Beshish (30), 2018, USA	Chart Review	38	median 2 mo. (0.2–17.8)	58	NR	NR
JM Costello (41), 2012, USA	Cohort	41	NR	NR	median 55d (13–246)	NR
G Garcia Guerra (44), 2014, Canada	Cohort	47	median 3.2 mo. (0.6–7.5)	59	NR	median 26d (16–46)
JK Gunn (50), 2016, Australia and New-Zealand	Cohort	152	median 7 mo. (4–11)	64	median 28d (19–38)	median 4d (3–7)
C Limperopoulos (60), 2001, Canada	Cohort	87	mean (SD) 20.5 mo. (8.1)	NR	NR	NR
C Limperopoulos (59), 2002, Canada	Cohort	81	mean (SD) 20.1 mo. (7.8)	NR	NR	NR
T Matsuzaki (63), 2010, Japan	Cohort	39	NR	49	mean 37.2d (12.1)	mean 5.6 d (2.3)
N Naef (64), 2017, Switzerland	Cohort	GD: 64 No GD: 169	NR	GD:47 No GD:62	NR	GD: median 6d (2–117) no GD: median 6d (1–232)
J Simons (69), 2012, USA	Cross-sectional	27	median 1.9 mo.(1–5)	52	median 11d (8–22)	median 6d (2–15)
PK Suominen (70), 2011, Finland	Cross-sectional	29	NR	62	NR	median 1.5d (1–15)
Traumatic Brain Injury						
TD Bennett (28), 2016, USA	Cohort	196	mean 6.7y (5.4)	63	median 8d (4–13)	median 3d (1–6)
AH Haider (51), 2007, USA	Chart Review	7778	range 2–16y	64	mean 3d	mean 3d
T Kapapa (56), 2010, Germany	Chart Review	48	mean 5.9y (19d–14.5y)	67	mean 16.6d (2–54)	NR
AB Maddux (62), 2018, USA	Cohort	65	median 7.1y (0.8–12.3)	71	median 34d (17–52)	median 10d (5–11)
G Sakellaris (68), 2006, Greece	Experimental	19	mean 8.6y	NR	mean: 32.8d	mean: 21d
P Tomlin (71), 2002, UK	Cohort	82	NR	73	median 19d (3–181)	median 5d
Sepsis						
T Allport (26), UK, 2008	Cohort	9	range: 9m–17y	NR	NR	NR
CMP Buysse (33), 2007, The Netherlands	Cohort	145	median 3.5y (0.1–17.9)	50	NR	median 3d (1–51)
CMP Buysse (31),2009, The Netherlands	Cohort	120	median 3.1y (0.1–17.9y)	52.	NR	median 3d (1–51)

CMP Buysse (34), 2010, The Netherlands	Cohort	120	median 3.1y (0.1–17.9 y)	52	NR	median 3d (1–51)
CMP Buysse (32), 2008, The Netherlands	Cohort	47	median 3.7y (0.1–16.1)	60	NR	median 4d (1–18)
P Vondracek (76), 2006, Czech Republic	Case series	5	median 13 y (9–15)	40	NR	NR
Burns						
AM Al-Mousawi (25), USA	Experimental	10	mean 13.7y (3.6)	70	NR	mean 28d (11)
G Foncerrada (44) 2017, USA	Cross-sectional	24	mean 14.5y (3)	83	24.5 (9.5)	NR
M Rosenberg (67), 2013, USA	Experimental	14	NR	71	NR	NR
Trauma						
OZ Ahmed (24), 2019, USA	Cohort	553	median 5.7y (1.3–11.8y)	60	median 3.0d (1.6–7.7d)	median 1.5d (0.8–2.9)
Pertussis						
JT Berger (29), 2018, USA	Cohort	111	<3 mo:86 >3 mo. –1y:14	41	NR	median 6d (3–12)
Liver transplant						
AG Feldman (43), 2016, USA	Cohort	263	median 4.8y (1.3–11.4)	47	median 20d (14–29)	NR
Hematologic						
J Gregory (49), 2019, USA	Chart review	5	median 106 mo. (88–142)	20	Median 47d (37–57)	Median 21d (9–35)
Bacterial meningitis						
ET Madagame (61), 1995, USA	Case series	32	median 9.8 mo. (9d –2y)	41	NR	NR

Studies reporting cross-sectional PF scores (n=31)					
Study	**Measurement instruments**	**Timing of assessment**	**Extracted scale(s)/ ICF-CY (sub)domain**	**Cross-sectional scores**	**Determinants of reported PF-findings (+/-)**
G A Pereira (65)	FSS	PICU DC	Motor function	Moderate motor dysfunction	Re-admission group[#] (-)
R J Gemke (46)	HUI2	PICU AM	Functioning in mobility and self-care	Pre-morbid disability in mobility and self-care in resp. 59% and 44% of the sample	NA
S Jones (55)	HUI2	Post-PICU AM: 6 mo.	Functioning in mobility and self-care	Disability in mobility and self-care resp. 32% and 33% of the sample, of which 18% severe disability in mobility and 25% severe disability in self-care.	Not specified
L van Zellem (74)	HUI2/HUI3; ITQOL-97 or CHQ-PF50 or CHQ-CF87	post PICU DC: median 5.6y (1.8-11.9)	Functioning in mobility, self-care, ambulation and dexterity; physical functioning	Significant lower functioning in mobility (-2SD), self-care (-1SD to -2SD), ambulation (-1SD to -2SD) and dexterity (<-3SD) compared to reference norms. No sign. differences in PF (ITQOL/ CHQ) compared to reference norms.	Age at ICU admission (ns); Basic Life Support/Advanced Pediatric Life Support (ns); pre-existing condition (ns); cardiac arrest location (ns); SES (ns); in-hospital cardiac arrest versus out-of-hospital cardiac arrest (ns).
N J Vet (75)	ITQOL-97 or CHQ-PF50 or CHQ-CF87	Post-PICU DC: median 58d (47-90)	Physical functioning	Significant worse physical functioning in 0-3y sample compared to reference norms. Because of small groups, no data were presented in children 4-17y.	NA
S L Ward (77)	CHQ-PF or CHQ-CF	Post-PICU AM: mean 10.7 mo. (3.9)	Physical functioning	Mild to moderate disabilities (-1SD to -2SD) reported by parents compared to both asthma and healthy norms (sign.). No sign. differences in PF reported by children compared to healthy norms.	Race (ns); gender (ns); parent employment outside of the home (ns).
R S Watson (78)	ITQOL-97; PedsQL	Post-PICU DC: median 6.9 mo. (5.7-8.5)	Physical functioning	In children <2y: on average mild to moderate disabilities (-2SD to -1SD). In children >2y: mild to severe disabilities (< -1SD) in resp. 25% (parent report) and 47% (child report) of the sample compared to reference norms (p-values not stated).	NA
R S Watson (79)	ITQOL-97; PedsQL	Post-PICU DC: median 6.9 mo. (5.7-8.5)	Physical functioning	In children <2y with normal and impaired baseline function; resp. very mild (0 to -1SD) and severe (-2SD to -3SD) disabilities compared to reference norms (sign). In children >2y with normal and impaired baseline function; resp. no sign. difference and severe disabilities (-2SD to -3SD) compared to reference norms (sign.).	Not specified
F Torres-Andres (72)	PedsQL 4.0	Post-PICU AM: median 3y (1.5-4.5)	Physical functioning	Higher values of PF in subsample with normal brain imaging compared to subsample with abnormal brain imaging (sign.)	Abnormal brain image[#] (-)
H K Chandler (36)	PedsQL 4.0	Post-hospital DC: median 4.4y (2.5-5.8)	Physical functioning	Mild to severe disabilities (<-1SD) in 25% of the sample compared to reference norms (p-value not stated).	Not specified

N P Conlon (40)	PedsQL 4.0	Post-PICU DC: mean 6.3y (2.4)	Physical functioning	Mild to severe disabilities (<-1SD) in 31% of the sample compared to reference norms (p-value not stated).	Presence of a chromosomal disorder[#] (-). Gender (ns), presence of extreme prematurity (ns), presence of congenital heart disease (ns), number of organs supported (ns).
E Kyösti (58)	15D, 16D or 17D	Post-PICU DC: mean 6.3 y (0.7)	Functioning in mobility/moving and eating	A slightly lower functioning in mobility/moving and eating compared to reference norms (ns).	Not specified
J M Costello (41)	CHQ-PF50 or CHQ-CF87;	Post-hospital DC	Physical functioning; Structures/functions related to movement	Mild to moderate disabilities (-2SD to -1SD) in the sample compared to reference norms (sign). Higher prevalence (15%) of orthopaedic joint or bone problems compared to reference norms (sign.)	Not specified
G Garcia Guerra (45)	PedsQL 4.0	Post-hospital DC: mean 4.7y	Physical functioning	Mild to severe disabilities (< -1SD) in 34% of the sample compared to reference norms (sign.).	Higher inotrope score in the first 24 hours of extra corporeal life support [†] (-);ES, –1.29; ; Longer hospital LOS in days[†] (-) ES, –0.10; ; Post-surgery Congenital Heart Disease -children without extra corporeal life support [#] (+). All other studied demographic variables (ns)
P K Suominen (70)	15D or 17D	Post-drowning: median 10.3y (1.8-21.8)	Functioning in mobility/moving and eating	On average a lower functioning in moving and eating in children >16y compared to reference norms (ns). Worse functioning in eating in children ≤11 y (ns), with no difference in mobility compared to reference norms.	NA
T Matsuzaki (63)	Bayley Scales of Infant and Toddler Development -II	Post-hospital DC	Motor performance	Lower overall motor performance with 59% of the sample scores -1SD compared to norms (sign.), in particular gross motor performance is affected (sign.).	Gestational age (ns); birthweight (ns); age at surgery (ns); weight at surgery (ns); height at surgery (ns); head circumference at surgery (ns); CPB time (ns); DHCA time (ns); postoperative hospital LOS (ns); ICU stay (ns).
Limperopoulos (59)	Peabody Development Motor Scales	Post-surgery: 12-18 mo.	Motor performance	Low gross and/or fine motor performance (< -1.5 SD) in 42% of the sample compared to reference norms (p-values not stated).	Determinants of FM performance: longer DHCA for each minute difference[†] (-) OR 1.04; longer ICU LOS[†] (-) OR 1.05; abnormal preoperative neurodevelopmental status[†] (-) OR 4.7; acyanotic defects[†] (-) OR 9.3; pre- and postoperative microcephaly[#] (-); longer hospital LOS[#] (-); abnormal postoperative neurodevelopmental status[#] (-); weight <2nd percentile[#] (-); height <2nd percentile[#] (-). Determinants of GM performance: longer ICU LOS[#] (-); acyanotic defects[#] (-); increasing age at surgery[#] (-); abnormal pre- and postoperative neurodevelopmental status[#] (-); longer DHCA[#] (-); longer hospital LOS[#] (-); higher number of subsequent admissions[#] (-); height <2nd percentile (-); persisting cyanosis[#] (-). CPB (ns), Corrective

					versus palliative open heart surgery (ns); 0_2 saturation <85% (ns); ongoing need for medication (ns); maternal and paternal education (ns).
J Simons (69)	Bayley Scales of Infant and Toddler Development -III	Post-surgery: ca. 22 mo.	Motor performance	Lower gross motor performance compared to reference norms (sign.), no sign. difference in fine motor performance.	Determinants of BSID FM scores: longer PICU LOS† (-), R^2 41.4%. Premature birth (ns); presence of sign. comorbidity (ns); decrease in regional oxygen saturation from baseline (ns); hospital LOS (ns). Determinants of BSID GM scores: presence of sign. comorbidity† (-), R^2 43.5%. Premature birth (ns); presence of sign. comorbidity (ns); history of multiple cardiac procedures (ns); cumulative exposure to DHCA (ns); sociodemographic variables (ns); pre- and postoperative cyanosis (ns). Determinants of FM performance: born prematurely# (-); presence of sign. comorbidity# (-). Determinants of GM performance: longer duration of DHCA# (-); presence of sign. comorbidity# (-)
J K Gunn (50)	Bayley Scales of Infant and Toddler Development -III	Post-surgery	Motor performance	Lower motor performance of -1SD and -2SD compared to reference norms in resp. 12% and 2% of the sample (sign.)	Higher gestational age† (+), coef. 2.1; repeat cardiac surgery† (-), coef. -5.4; Higher partial pressure of carbon dioxide† (-), coef. -0.5, Higher Serum S100B 48h post-ok† (-), coef. -16.6. Other demographic, preoperative, intraoperative and postoperative factors reported in the study (ns).
N Naef (64)	Physical exam; Zurich neuromotor assessment	Post-surgery	Muscle tone and tendon reflexes; Motor performance	Severe muscle tone and tendon reflex abnormalities in 47% of the children with- and 4% of the children without a genetic disorder. Lower motor performance scores in children with (< -1.4 SD) and without (< -0.5SD) a genetic disorder compared to norms (sign). The rate of children without a genetic disorder performing below the 10th percentile ranged from 21.2% to 41.1%.	Determinants in general: presence of a genetic disorder# (-); Determinants in non-genetic disorder group: longer ICU LOS in days† (-) coef. -0.283; occurrence of postoperative seizures† (-) coef. -0.356. Prematurity (ns); birth weight (ns); preoperative neurologic severity score (ns); cardiac medication at 6y (ns); SES at 6y (ns); preoperative cyanosis (ns); cumulative extracorporeal circulation time (ns).
Limperopoulos (60)	WeeFIM 2	Post-surgery: 12-18 mo.	Functioning in mobility and self-care	Moderate- and severe disability in mobility in resp. 46% and 20% of the sample. Moderate- and severe disability in selfcare in resp. 39% and 7% of the sample.	Not specified
C M P Buysse (33,34)	CHQ-PF50, CHQ-CF87 or SF-36	Post PICU DC: median 10y (3.7–17.4)[33] Post-PICU DC: median 9.8y (3.7–17.4)[34]	Physical functioning	Lower PF compared to reference norms reported by parents (sign) and children (ns).	PICU LOS† (-) r_s,-0.31; problem behaviour† (-) r_s,-0.25; major physical sequelae† (-) MD -6.3; higher disseminated intravascular coagulation score in patients >18 y† (+) r_s, 0.39. Age at admission (ns), PRISM (ns), vasopressor score (ns), mild neurological impairments (ns), IQ<85 (ns)

C M P Buysse (31)	Physical exam; Radiograph	Post-PICU DC: median 9.8y (3.7–17.4y)	Structures related to movement, functioning in walking and running	Amputations of extremities in 8% of the sample, of which 3% walks with protheses, use crutches or wheelchair and 6% with dysfunction in walking/running. Limb-length discrepancy in 6%, resulting in limping, difficulty walking and angular deformity.	Determinants of amputation: higher severity of illness scores[#] (-). Determinants of limb length discrepancy: higher severity of illness scores[#] (-); younger age at PICU admission[#] (-)
C M P Buysse (32)	Physical exam; CHQ-PF50 or ITQOL-97	Post-PICU DC: median 14 mo. (10-28)	Structures related to movement; Physical functioning	Amputation and limb shortening in 4% and pes equinus in 2% of the sample; Lower PF compared to reference norms (sign).	Longer PICU stay[†] (-) R^2 40%; higher PRISM[†] (-) r_s, -0.37; higher vasopressor score[†] (-) r_s, -0.54; higher disseminated intravascular coagulation score [†] (-) rs -0.45; need for follow-up care[†] (-) MD -9.7. Age at PICU admission (ns); chronic complaints (ns).
T Allport (26)	Assessment of Motor and Process Skills; CHQ-PF or SF-36; physical exam and interview	Post-PICU AM: 3-6y	Motor performance; Physical functioning; Structures/functions related to movement	Low to very low motor performance (< -2SD) in 56% of the sample compared to reference norms (p-values not stated). Mild to severe disabilities (< -1SD) in 67% compared to norms (p-values not stated). Use of lower-limb protheses in 100%, accompanied with postural difficulties, asymmetric limb growth, joint effusion, muscle atrophy (% not specified)	NA
G Sakellaris (68)	FOC	Post-hospital DC: 6 mo.	Functioning in locomotion and self-care	Disability in locomotion and self-care in resp. 47% and 52% of the sample.	NA
T Kapapa (56)	Questionnaire; SF-36	post trauma: mean 2.1y	Functions related to movement; Physical functioning	Coordination problems, lack of balance, tremors and form of total paresis/plegia in resp. 29%, 25%, 8% and 25% of the sample. Disabilities in the severe (65%) and mild head trauma group (29%) (p-values not stated).	NA
A H Haider (51)	WeeFIM	Hospital DC	Functioning in locomotion and eating	Increased odds in locomotion disability OR 1.40 (CI: 1.15–1.70) and eating OR 1.32 (CI: 1.06-1.63) in black children compared to white children (sign.).	Black children[#] (-)
A G Feldman (43)	PedsQL 4.0	Post-transplant: between 12-24 mo.	Physical functioning	Mild to severe disabilities (< -1SD) in 33% (reported by children) and 35% (reported by parents) of the sample compared to reference norms (sign.). PF scores were higher in liver transplant-survivors with optimal health than those with nonoptimal health (sign.)	Primary disease (comorbidity) OR 2.1; height < -1.64 at long term follow-up visit[†] (-) OR 1.9; >4 days of hospitalization since long term follow-up visit[†] (-) OR 1.8; being listed as status 1[†] (+) OR 0.4; pretransplant optimal health[#] (+). Other studied demographic, pretransplant and posttransplant variables (ns)
G Foncerrada (44)	Dynamometer; Modified Bruce treadmill test	PICU DC	Muscle strength; Aerobic capacity	No difference in muscle strength between both groups (ns). Lower aerobic capacity in the electrical burn group than in the flame burn group (sign.).	Electrical burns[#] (-)
Studies reporting longitudinal PF scores (n=11)					
Study reference	**Measurement instruments**	**Timing of assessment**	**Extracted scale(s)/ ICF-CY (sub)domain**	**longitudinal PF scores**	**Determinants of reported PF-findings (+/-)**

J A Heneghan (52)	FSS	PICU AM and hospital DC	Motor function	Decline of motor function in 34% of the subsample with “new morbidity” (p-value not stated). Decline in the subsample with "no new morbidity" was not specified.	Not specified
G Keim (57)	FSS	PICU AM and hospital DC	Motor function	Decline of motor function in 11% of the sample discharged home (ns). Decline in 52% of the sample discharged to rehabilitation (sign)	Not specified
M Pollack (66)	FSS	PICU AM and hospital DC	Motor function	Decline of motor function in 7% of the sample (p-value not stated)	Not specified
F Cunha (42)	HUI3	PICU AM, post-PICU AM: 6 mo.	Functioning in ambulation and dexterity	Decline in ambulation and dexterity in resp. 7% and 9% of the sample (p-values not stated). Improvement in ambulation and dexterity in resp. 9% and 5% of the sample (p-values not stated).	Not specified
R J Gemke (47)	HUI2	PICU AM and post-PICU DC: 1y	Functioning in mobility and self-care	Decline in mobility and self-care in resp. 11% and 12% of the sample (p-values not stated). Improvement in mobility and self-care in resp. 23% and 12% of the sample (p-values not stated).	NA
R W Johnson (54)	Ultrasound; EIM	Multiple assessments during PICU stay	Muscle trophic/thickness; muscle composition	A diaphragm and quadriceps muscle thickness decrease by resp. 2.2%/day and 1.5%/day (sign.). Decrease in biceps brachii and tibialis thickness (ns). Muscle atrophy (diaphragm atrophy in 47% of the sample, 83% with atrophy in ≥1 muscle group, and 47% in ≥2 muscle groups) occurring within 5–7 days during PICU stay. Increased fat percentage in biceps and tibialis and decreased muscle quality in biceps, quadriceps and tibialis (sign.).	Determinants of biceps brachii atrophy: presence of TBI† (-) coef. -21.3, hospital LOS† (+) coef. 0.27; increasing age† (-) coef. -0.46. Determinants of tibialis atrophy: increasing age† (-) coef. -18.53; SaO2 most abnormal† (-) coef. -0.42; hyperglycemia# (-); presence of TBI# (-); hospital LOS (ns);. Determinants of quadriceps atrophy: increasing PRISM score† (+)coef. 0.38; down syndrome# All other studied demographic and clinical determinants (ns). No sign. determinants of diaphragm atrophy In general for muscle atrophy: mechanical ventilation for >2 days# (-)
B L Banwell (27)	MRC;Electromyographic; muscle biopsy	Multiple assessments during hospital stay; post-hospital DC 3 mo. and 8-18 mo.	Muscle strength; structures related to movement	Muscle weakness in 1.7% of the patients and persisted for 3 to 12 mo. after DC (p-values not stated). Abnormal findings of the muscle structure in 80-100% of the sample during hospital stay (p-values not stated).	NA
C L Glau (48)	Ultrasound	Multiple assessments during PICU stay	Muscle trophic/thickness	Mean sample daily diaphragm atrophy rate of -3.4% (-5.6 - 0%) during PICU stay (sign.).	Higher spontaneous breathing fraction† (+) coef. 9.4. Subjects with low overall spontaneous breathing fraction exposed to neuromuscular blockade infusion# (-).

					Subjects with low overall spontaneous breathing fraction exposed to corticosteroid (ns)
F V Valla (73)	Ultrasound	Multiple assessments during PICU stay	Muscle trophic/thickness	Decrease of quadriceps femoris muscle thickness during PICU stay (mean change of thickness -0.05 cm per day), concerning the majority of children of all admission weight ranges (sign.).	Cumulative energy or protein deficit (ns).
O Z Ahmed (24)	FSS	PICU AM and hospital DC	Motor function	Decline of motor function in 14% of the sample (p-value not stated).	Increasing number of body regions with at least one severe injury[#] (-); injuries to body regions[#] (-)
J Gregory (49)	FSS	PICU AM and hospital DC	Motor function	Decline of motor function in 100% of the sample (p-values not stated).	Not specified
Studies reporting cross-sectional and longitudinal PF scores (n= 14)					
Study reference	**Measurement instruments**	**Timing of assessment**	**Extracted scale(s)/ ICF-CY (sub)domain**	**Cross-sectional and longitudinal PF scores**	**Determinants of reported PF-findings (+ / -)**
G A Colville (39)	PedsQL 3.1	post-PICU DC: mean 3.1 mo. (0.8) and 13 mo. (2.1)	Physical functioning	Cross-sectional: PF still below the reference norms at the end of follow-up (sign.). Longitudinal: mean sample improvement of 10% in PF (sign.)	Determinants of TBI emergency group: posttraumatic stress symptoms[†] (-), r_s, -.40 Determinants in general: elective group[#] (-)
S Chakdour (35)	6-Minute Walk Test	post-PICU DC: 3.5 mo. and 10.6 mo.	Walking	Cross-sectional: distance walked still below the reference norms at the end of follow-up (sign.). Longitudinal: mean sample improvement of 14% in walking distance (sign.).	Age (ns), sex (ns), severity of lung injury (ns), mechanical ventilation parameters (ns), oxygenation indices (ns).
K Choong (37)	PEDI; joint mobility test; MRC scale	PICU AM, post-PICU DC: 3 mo., 6 mo.	Functioning in mobility and self-care; joint mobility; muscle strength	Cross-sectional: PF did not reach baseline functioning at the end of follow-up. New onset contractures in 3% of the sample at PICU DC. Longitudinal: decline in functioning in both domains with improvement over time. Suspected PICU-acquired weakness in 30%, confirmed in 6.7% of the sample. For all outcomes p-values not stated.	NA
K Choong (38)	PEDI-CAT; joint mobility test; MRC scale	PICU AM, PICU DC, post-PICU DC: 3 mo., 6 mo.	Functioning in mobility and daily activity; joint mobility; muscle strength	Cross-sectional: 24% and 14% did not returned to resp. baseline mobility and daily activity functioning. Longitudinal: decline in functioning in both domains, with improvement over time. New onset contractures in 1% of the sample at PICU DC. PICU-acquired weakness in 22.5% of the sample. For all outcomes p-values not stated.	Determinants of decline in mobility at DC: higher baseline function[†] (-) coef. 0.4; neurologic insult at PICU AM[†] (-) coef. 9.4, preexisting comorbidity[†] (+), coef. -6.1. Determinants of decline in daily activity at DC: higher baseline function[†] (-) coef. 0.3; neurologic insult at PICU AM[†] (-) coef. 5.4; preexisting comorbidity[†] (+) coef. -4.2. No significant determinants of decline: PRISM, PICU-acquired complications.

					Determinants of recovery in mobility at 6 mo.: higher baseline function† (-) coef. 0.1; neurologic insult† (-) coef. 3.9; increasing age† (-) coef. 0.4. Determinants of recovery in daily activity at 6 mo.: higher baseline function† (-) coef. 0.1; neurologic insult† (-) coef. 2.6;increasing age† (-) coef. 0.3. No significant determinants of recovery: PRISM, Preexisting comorbidity, PICU-acquired complications.
A G Beshish (30)	FSS	Hospital AM and hospital DC	Motor function	Cross-sectional: 25% with mild to moderate and 25% with (very) severe motor dysfunction at DC (ns). Longitudinal: decline in motor function in 50% of the sample (ns)	Not specified
P Vondracek (76)	MRC scale; tendon reflex tests; Barthel index	Multiple assessments during first 28d PICU stay and 1 y post-PICU AM	muscle strength; motor reflex function; ADL-functioning	Cross-sectional: ADL disabilities present at 1 year (ns). Longitudinal: two out of 5 patients (40%) with muscle dysfunctions during first 28 days with improvement at 1 year (p-values not stated).	NA
J T Berger (29)	Motor strength test; motor tone test; Mullen scales of early learning	PICU DC and 1y post PICU DC	Motor strength; motor tone; motor performance	Cross-sectional: on average lower motor performance in the sample compared to reference norms (ns). Longitudinal: decline in motor strength in 3% of the sample (ns). Improvement in motor tone in 1% of the sample (ns).	Not specified
A M Al-Mousawi (25)	Dynamometer	post-PICU AM: 6 mo.; 9 mo.	Muscle strength (knee extensor)	Cross-sectional: muscle strength slightly below the reference norms at the end of follow-up (p-value not stated). Longitudinal: mean sample improvement of 11-12% in muscle strength (ns),	NA
M Jayshree (53)	HUI2	PICU AM and post-PICU DC: 1y	Functioning in mobility and self-care	Cross-sectional: mobility was affected in 49% and self-care was affected in 39%. Longitudinal: decline in mobility and self-care in resp. 11% and 13% of the sample (p-values not stated)	Not specified
T D Bennett (28)	FSS	PICU AM and hospital DC	Motor function	Cross-sectional: moderate to (very) severe motor dysfunction in 23% of the sample at DC. Longitudinal: decline of 0.9 point (1.2) on FSS in the sample (p-value not stated).	Not specified
A B Maddux (62)	WeeFIM 2; FSS	PICU DC and hospital DC	Functioning in mobility and self-care; Motor function	Cross-sectional: mobility dependence required in 57% of the sample at PICU DC; Motor dysfunction in 82% of the sample at PICU DC. Longitudinal: substantial improvement in mobility and self-care but many children had persistent disability (p-values not stated)	Not specified

P Tomlin (71)	Devised questionnaire	Hospital DC, post-hospital DC: 6 w, 6 mo. and 12 mo.	Functioning in walking, dressing and fine-motor skills	Cross-sectional: disability in walking in 77% and dressing in 76% at DC of the sample. Longitudinal: of whom with a disability in walking, 50% showed improvement at 12 mo. post DC and 45% showed improvement in dressing at 12 mo. post DC. Decline in fine motor function in 66% of the sample at DC and at 6 and 12 months 30% still below the reference norms. Overall p-values not stated.	NA
M Rosenberg (67)	CHQ-CF 87 and CHQ-PF 28	PICU DC; post-PICU DC: 3 mo.	Physical functioning	Cross-sectional: On average 2SD (reported by parents) and 3SD (reported by children) below the reference norms at PICU DC Longitudinal: improvement over time (ns).	NA
E T Madagame (61)	FOC	Hospital DC and Post-hospital DC: median 41.5 mo. (range 7-77)	Functioning in locomotion and self-care	Cross-sectional: disability in locomotion in 68% of the sample at DC. Disability in self-care in 55% of the sample at DC Longitudinal: of whom with a disability in locomotion, 25% recovered to normal (p-values not stated). Of whom with a disability in self-care, 16% recovered to normal (p-values not stated).	Not specified

AM, admission; BSID, Bayley Scales of Infant and Toddler Development; CHQ-CF, Child Health Questionnaire- Child Form; CHQ-PF, Child Health Questionnaire- Parent Form; CPB, Cardiopulmonary Bypass; d, days; DC, discharge; DHCA, Deep Hypothermic Circulatory Arrest; ES, Effect size; FM, Fine Motor; FOC, Functional Outcome in Children; FSS, Functional Status Scale; GM, Gross Motor; HUI, Health Utility Index; ICF, International Classification of Functioning; Disability and Health, IQR; Interquartile Range, ITQOL-97; Infant and Toddler Quality of Life Questionnaire-97, LOS; Length of Stay; MD, mean difference (in scores); mo., months; MRC scale, Medical Research Council scale; NA, Not Applicable; nr, not reported; NS, not significant; OR= Odds Ratio;; PEDI, Pediatric Evaluation of Disability Inventory; PEDI-CAT, Pediatric Evaluation of Disability-Computer Adaptive Test; PedsQL,Pediatric Quality of Life Inventory; PF, physical functioning; PICU, Pediatric Intensive Care Unit; PRISM, Pediatric Risk of Mortality Score; $R^{2,}$ explained variance; r_s, Spearman's rho; SD, Standard Deviation; SES, Socioeconomic status; SF-36, Short form-36; sign. significant; WeeFIM, Functional Independence Measure for children; y, years; 15D, 15 dimensions; 16D, 16 dimensions; 17D, 17 dimensions; (+) , positive influence on outcome; (-) , negative influence on outcome. [#] determinant sign. associated with PF, strength of association unknown. [†] determinant sign. associated with PF, strength of association reported

Measurement instruments	Characteristics of measurement instruments	Body functions					Body structures				Activities and participation						Environmental factors		
		Resp. muscle (b445)	Exercise tolerance (b455)	Defecation (b5253)	Urination (b6202)	Joints and bones (b710-b729)	Muscle (b730-b749)	Movement (b750-b789)	Muscles of respiration (s4303)	Structures related to movement (s7)	General tasks and simple tasks (d210)	Mobility (d4)	Self-care (d5)	Domestic life: (d640)	Recreation and leisure (d920)	Products for consumption (e110)	Products and technology for use in daily living (e115)	Products for in- and outdoor mobility (e120)	Support and relation-ships (e3)
Global Health functioning instruments (n=18)																			
FSS; motor domain (n=9)[24,28,30,49,52,57,62,65,66]	Objective: scale assessed by HP						x	x											
FOC; locomotion, self-care (n=2) [61,68]	Objective: scale assessed by HP											x	x				x	x	x
HUI2; mobility, self-care (n=5) [46,47,53,55,74]	Subjective PRO-CR (≥ 12y) and PR (≤ 5y) questionnaire											x	x				x	x	x
HUI3; ambulation, dexterity (n=2) [42,74]	Subjective PRO-CR (≥ 12y) and PR (≤ 5y) questionnaire											x					x	x	x
Health related QoL instruments (n=26)																			
CHQ; PF domain (n=8) [26,32,33,41,67,74,75,77]	Subjective: PRO-PR (5-18y) and PRO-CR (≥10y) questionnaire											x	x		x				
SF-36; PF domain (n=3) [26,33,56]	Subjective: PRO-CR (≥ 17y) questionnaire											x	x		x				
ITQOL-97; Physical abilities (n=5) [32,74,75,78,79]	Subjective: PRO-PR (0-5y) questionnaire											x	x						x
PedsQL 3.1 / 4.0; PF domain (n=8) [36,39,40,43,45,72,78,79]	Subjective PRO-CR (5-7y; 8-12y; 3-18y) and PR (2-4y) questionnaire		x									x	x	x	x				
15D, 16D, 17D; mobility/moving, eating (n=2) [58,70]	Subjective PRO-CR (15D; 16D) and PR (17D) questionnaire											x	x				x	x	x
Biophysical instruments (n=10)																			
Radiograph (n=1) [31]	Objective: interpreted by HP									x									
Dynamometry (n=2) [25,44]	Objective: interpreted by HP						x												
Electromyography (incl. EIM) (n=2) [27,54]	Objective: interpreted by HP									x									
Diaphragm Ultrasound (n=2) [48,54]	Objective: interpreted by HP	x							x										
Peripheral muscle ultrasound (n=2) [54,73]	Objective: interpreted by HP									x									

Muscle biopsy (n=1) [27]	Objective: interpreted by HP								x													
Neuromotor development instruments (n=7)																						
AMPS; motor skills (n=1) [26]	Objective: performance test assessed by HP (≥ 4y)											x										
MSEL; fm and gm domain (n=1) [29]	Objective: performance test assessed by HP (0-68mo)						x					x										
BSID-2 / BSID-3 fm and gm domain (n=3) [50,63,69]	Objective: performance test assessed by HP (16d-42.5mo)				x		x			x		x										
PDMS (n=1) [59]	Objective: performance test assessed by HP (0-5y)				x		x			x		x										
ZNA (n=1) [64]	Objective: performance test assessed by HP (3-18y)						x			x		x										
PF Scales, Scores, and Questionnaires (n=12)																						
6MWT (n=1) [35]	Objective: performance test assessed by HP											x										
PEDI; mobility, self-care (n=1) [37]	Objective (parent/HP observation) and Subjective (PRO-PR questionnaire) 0-21y		x	x								x	x								x	
PEDI-CAT; mobility, daily activities (n=1) [38]	Objective (parent/HP observation) and Subjective (PRO-PR questionnaire) 0-21y		x	x								x	x	x						x	x	
MRC scale (n=4) [27,37,38,76]	Objective: scale assessed by HP				x																	
Modified Bruce treadmill test (n=1) [44]	Objective: performance test assessed by HP	x																				
WeeFIM; locomotion, eating (n=1) [51]	Objective: parent/HP observation scale (6mo-7y)											x	x			x	x			x	x	
WeeFIM 2; mobility, self-care (n=2) [60,62]	Objective: parent/HP observation scale (6mo-7y)		x	x								x	x			x	x			x	x	
Barthel index (n=1) [76]	Objective: parent/HP observation scale		x	x								x	x			x	x			x	x	
Physical exams/interviews (n=12)																						
C M P Buysse [31]	Objective: physical exam assessed by HP						x		x			x										
C M P Buysse [32]	Objective: physical exam assessed by HP								x													
T Allport [26]	Objective: physical exam assessed by HP and parent interview				x		x		x								x					
J.T. Berger [29]	Objective: assessed by HP				x																	

K. Choong (37,38)	Objective: assessed by HP	x													
J.M. Costello (41)	Subjective: PRO-PR questionnaire	x				x									
T. Kapapa (56)	Subjective: PRO-CR questionnaire		x	x											
N. Naef (64)	Objective: assessed by HP		x	x											
P. Tomlin (71)	Subjective: PRO-PR questionnaire							x	x						x
P Vondracek (76)	Objective: assessed by HP			x											
B.L. Banwell (27)	Objective: assessed by HP			x											